CLASSIFICATION CONFIDENTIAL CONFIDENTIAL

CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT
CD NO.

50X1-HUM

COUNTRY USSR
SUBJECT Scientific - Engineering, internal combustion engines
HOW PUBLISHED Monthly periodical
WHERE PUBLISHED Moscow
DATE PUBLISHED Jun 1950
LANGUAGE Russian

DATE OF INFORMATION 1950
DATE DIST. 13 Dec 1950
NO. OF PAGES 2
SUPPLEMENT TO REPORT NO.

SOURCE Vestnik Akademii Nauk, No 6, 1950, pp 130-131.

GROSS CHANGES IN THE SHAPE OF A CYLINDER, THEIR NATURE AND INFLUENCE ON THE OPERATION OF AN INTERNAL-COMBUSTION ENGINE

Sh. M. Bilik

/The following is a digest of a dissertation defended by its author Sh. M. Bilik, Candidate for the Doctorate at the Institute of Machine Studies, Academy of Sciences USSR. The official questioners were Prof Yu. A. Stepanov, N. R. Brilling, Doctor of Technical Sciences, and A. S. Orlin, who highly praised Bilik's work as being the first of its kind on the subject problem. Bilik's thesis comprises two volumes, totaling six chapters, whose contents are summarized briefly below. The information below was obtained from the section "Dissertations Defended" of Vestnik Adademii Nauk./

Chapter One

The pressing importance, to the national economy, of the subject of macrogeometric variations in engine cylinders is discussed. The author states that too much emphasis is placed on high-quality polishing and grinding of cylinder surfaces and none on accuracy of size and form. The considerable influence of deformed cylinders upon engine operation is not appreciated by the motor factories.

Chapter Two

The author introduces the results of his experimental investigations into the question of how the process of assembling engines causes variations in the cylinder geometry, and analyzes the deformation suffered at each stage of assembling. The following parameters are employed: maximum ovalness, ovalness relative to two mutually-perpendicular directions, conicity relative to cross section, maximum conicity, and oval conicity.

Chapter Three

By means of a special device, the author subjects thin-walled tubes of various sizes to various terminal loads. He simultaneously measures the deformations and stress distribution by the lacquer-coating method and by "tensometry," thus establishing the deformation as a function of the shell's geometric parameters; in

CLASSIFICATION CONFIDENTIAL CONFIDENTIAL

STATE	X	NAVY	X	NSRB		DISTRIBUTION
ARMY	X	AIR	X	FBI		

50X1-HUM

this connection he introduces his new concept of "terminal linear and imaginary linear effects." (The questioners were especially interested in this phase of the experiments.)

Chapter Four

The author considers variations in macrogeometry versus temperature and length of service of the cylinder, and describes special devices for imitating the heating in cylinders, thereby establishing the laws governing the changes in sleeve forms due to temperature. The author concludes that the introduction of definite gross changes in the sleeve's cylindrical form can limit distortions due to operations, wear and tear, and deformations resulting during assembly.

Chapter Five

The author studies macrogeometry versus engine operation by way of the appearance of the burning gases in the cylinder, also oil consumption and wear. He also investigates the phenomenon of "gas overflow" from the operating hollow of the cylinder, in dependence upon deformation, pressure drop, piston position, disposition of rings, and their quantity and quality. He shows how longer life of a cylinder can be obtained from a study of the wear of contact surfaces.

Chapter Six

The author concludes with general recommendations for practical design, construction, grinding, polishing, and repair of engine cylinders.

- E N D -